

IRIS-HEP Project Proposal: Developing a Jupiter Notebook for converting confocal microscopic images to 3D cell images and metrics calculation.

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The project's objective is to provide an interactive tool for evaluating confocal microscopic images of cells in order to determine their features, including volume, polarity, and cross-sectional area. The machine learning Python implementations "Cellpose" and "StarDist" should be able to identify cells and generate the corresponding 3D objects (Fig. 1). The final step is to include a mathematical component that outputs physical measurements and cell polarity. The entire project will be developed in Jupyter Notebooks.

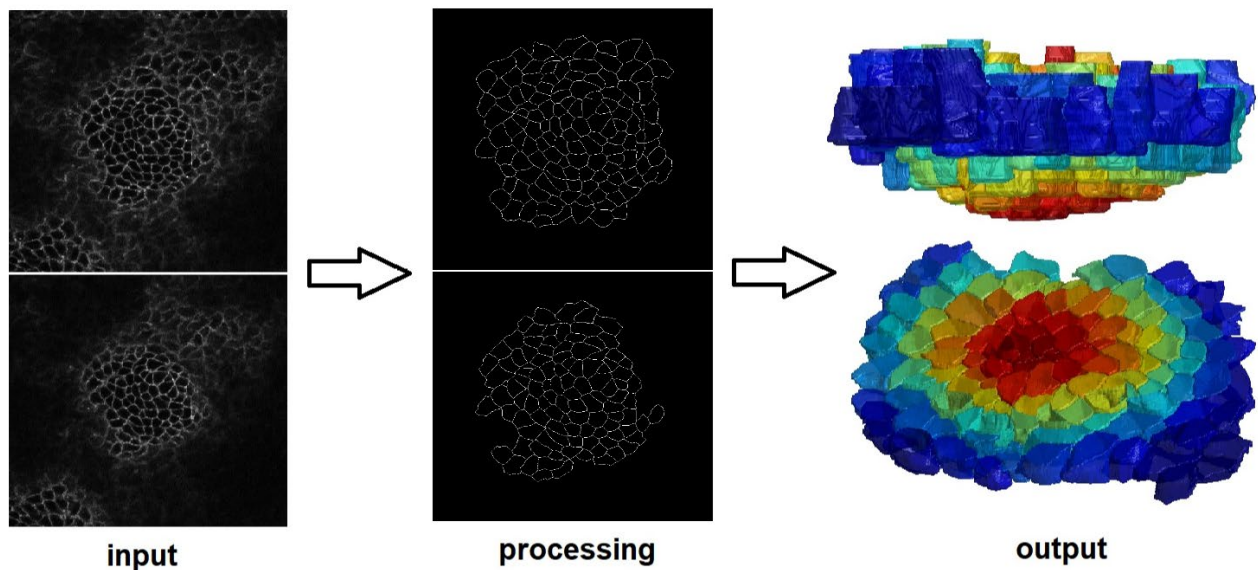


Figure 1. Creating a 3D model from the microscopic images.

Timeline.

Week 1-4: Combining “Cellpose” and “StarDist” to recognize cells and create 3D objects. In case of incompatibility of these instruments – creating the own ML recognition system.

Week 5-6: Implementing calculation of the cell parameters.

Week 7-10: Preparing the summary of the project work, writing documentation, uploading to a repository.